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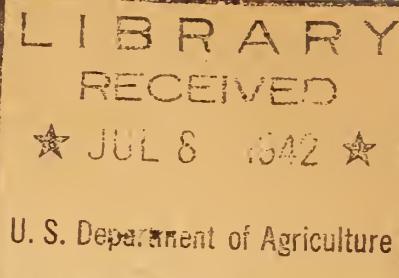
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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Marketing Administration
Bureau of Agricultural Chemistry and Engineering
and
Bureau of Plant Industry



GINNING LONG STAPLE AMERICAN UPLAND COTTON

Introduction

War requirements for fabrics needed in uniforms and other items have resulted in a tremendous drain on the supplies of American upland cotton 1-1/8 inches and longer in staple. To prevent a critical shortage, a program is now being put under way urging farmers to produce more long staple cotton than ever before.

In order to provide for mill requirements for 1942-43 and a moderate carry-over at the end of the season, about 1,400,000 bales of cotton 1-1/8 to 1-1/4 inches in staple should be produced this year. This is an increase of about 700,000 bales or almost double the production of such lengths in 1941. And, in addition, considerable quantities of cottons stapling longer than 1-1/4 inches will be needed.

Ginners of long and extra long staple upland cotton encounter problems not met with by ginners of short staple, and already such questions as the following are being raised: Should long staple upland cotton, particularly the extra long staples, be roller ginned or saw ginned? If a saw gin is to be used, what saw speeds are best? How important is seed roll density? What kind of cleaners should be used?

This paper has been prepared to assist farmers and ginners in harvesting, handling, and ginning long staple upland cotton so as to produce lint of the highest possible quality.

Long Staple Upland Cotton Ginning Requirements Differ From
Those of Sea-Island and American-Egyptian Cottons

Since large-scale cotton production began in the United States, saw gins have been used for American upland cotton and roller gins for sea-island cotton. Later, when American-Egyptian cotton came into the picture, roller ginning was adopted for it. The much greater capacity of the saw gin has resulted in its almost universal use on shorter cottons, whereas experience showed that roller ginning was needed to preserve the quality of the extra long cottons. The question as to whether saw gins or roller gins should be used for ginning long staple upland cotton has been raised in the past and it is natural, therefore, that it should be raised again at this time.

A number of comparative tests have been made by the U. S. Cotton Ginning Laboratory at Stoneville, Miss., with the use of both saw and roller gins on portions of the same cottons covering a wide range of staple lengths. The findings showed that saw ginning, when properly performed, is definitely superior to roller ginning in the case of long staple American upland cottons. This is true even for the extra long staples of upland. Advantages include better quality of cotton and more efficiency in ginning. Saw ginning gave more uniform staple length designations and better grade and preparation of lint than did roller ginning. Manufacturing tests have shown that, in a number of cases, the yarn spun from saw-ginned lint is smoother and less nappy than that spun from roller-ginned lint obtained from the same lot of seed cotton, even though the saw-ginned lint was not quite so free from neps as the roller-ginned lint.

On a basis of these findings and other observations, the U. S. Cotton Ginning Laboratory repeatedly has recommended to producers of long staple American upland cotton the use of loose-roll saw ginning rather than roller ginning. But, in spite of these recommendations, some growers in the South-eastern States, in the Mississippi Valley, and in the southwestern irrigated region continue to permit their long staple upland cotton to be ginned on roller gins at a loss compared with good saw ginning. Perhaps this has been done in some instances because the available saw ginning facilities were far from desirable, and that roller ginning seemed more desirable than poor saw ginning. Some inexpensive improvements in the saw-ginning equipment and operating practices, however, would make possible a better job of ginning.

• Why Saw Ginning is Superior to Roller Ginning for
Long Staple American Upland Cotton

Tests made at the U. S. Cotton Ginning Laboratory on medium and long staple American upland cottons have shown that the roller gin caused about 25 pounds of material to be added per bale. This extra poundage consisted principally of foreign matter, aborted seed motes, and short fibers. Present-day roller gins were designed to handle sea-island and American-Egyptian cottons, both of which have seed comparatively "slick" and free from fuzz. American upland cotton, however, has fuzzy seed which do not pass through the seed grid of a roller gin so readily as smooth seed. As a result, the upland seed, before being shed, come in contact with the knives of the roller gin to a greater extent than the slicker seed, thus causing a quantity of foreign material, aborted seed motes, and undesirable fibrous material to be added to the lint. Although this material may not reduce the staple length, it has an adverse effect on other quality elements of the lint, including the uniformity of the fiber length, sample preparation, and grade.

Roller gins remove the fibers from the seed without mixing them as thoroughly as is the case with saw gins, and as a result some parts of the bales are shorter in staple than others. For this reason, samples drawn from a roller-ginned bale will vary in length to a greater degree than saw-ginned lint, and make it difficult to give an accurate staple length designation to a bale.

The seed cotton of long staple American upland frequently contains many spotted locks as the result of moisture penetration, frost, soil stains,

or insects. Unless these spots are exceedingly numerous and heavy, the saw-ginning process will prevent the spots appearing in the ginned lint. Experiments have shown that these spots disappear because of the diffusing action of the gin saws. On the other hand, such spots frequently are not diffused by the roller gin, and are carried as spots into the ginned lint. In the comparative tests made in the laboratory, virtually all of the roller-ginned samples were classed as "Spotted," whereas the saw-ginned samples were free from spots and superior in grade, as well as in yarn strength and yarn smoothness.

Saw-ginned lint also has been found to be smoother and apparently brighter than roller-ginned lint. This results in a better "preparation" designation for the saw-ginned lint by the classer, and a higher grade brings a better price. Moreover, the saws do some additional cleaning of the cotton and this also aids in improving the grade.

Saw-ginned lint generally bales better than roller-ginned lint because of the uniform manner in which the lint-handling system of a saw gin deposits the lint in the press box. Lint produced by a roller gin is placed in the press box by hand, and is frequently folded and lumpy. Samples drawn from such bales have a poorer appearance than those from bales packed mechanically.

Classification of Roller-Ginned American Upland Cotton

Saw-ginned long staple upland cotton and roller-ginned cotton from the same seed cotton, when classed, have indicated differences in quality in favor of the saw-ginned lint and such differences have shown very good correlation with differences in spinning value.

It should be noted here that in the Department's cotton classing work the grade of all American upland cotton, whether saw-ginned or roller-ginned, must be determined according to the official cotton standards of the United States for grade of American upland cotton, otherwise known as the Universal Standards. The practical forms of such standards are, of course, prepared from saw-ginned lint. The preparation factor (smoothness of ginning) shown by these practical forms is that which is officially recognized as the normal preparation of saw-ginned cotton. Therefore, a great deal of the roller-ginned upland cotton must be reduced in grade on account of the rough preparation.

Suggestions for Saw Ginning Long Staple American Upland Cotton

In order that the new program for increasing the production of long staple cotton to meet military requirements may be successful, cotton farmers and ginners will have to make every effort to produce cotton of highest quality. This means they must exercise continuous care in all harvesting, handling, and ginning operations.

In harvesting and handling long staple American upland cotton, much loss in quality can be prevented and much value can be added to the crop if

producers and ginners will remember some important points and govern themselves accordingly. These are:

- (1) Excess foreign matter and moisture in the seed cotton reduce the value of the ginned products.
- (2) Undue exposure in the field results in discolored, dull, and trashy cotton, generally one full grade off for each month's exposure. To avoid losses and to simplify ginning problems, cotton should be picked frequently but not in an extremely wet condition.
- (3) To gin cotton in a green, damp, or wet condition, causes rough preparation and lowers the quality as much as 1 or 2 grades. This lowered quality may reduce the market value of long staple cotton as much as \$10 or more per bale. When dews are heavy, seed cotton will generally be too damp for good ginning if picked before 9 or 10 o'clock in the morning, and drying of these pickings during the day, only for as long as is necessary to remove the excess moisture, improves the ginning. If cotton is picked while damp, it can be dried artificially at the gin, or it can be dried naturally through proper handling and storing, provided it is not so wet that the seed are soft.
- (4) Gin machinery possesses definite limitations with respect to its effectiveness in handling carelessly harvested cotton. Present-day drying, cleaning, and extracting machinery--effective as it is--is not effective enough to put roughly harvested, trashy, or wet cotton in such condition that it will gin out a sample equal in quality to that ginned from clean cotton, hand picked under relatively dry conditions.
- (5) Ginning the seed so close with dense seed rolls as to cause particles of seed coat fragments to get into the lint will lower the grade and value of the lint enough to more than offset the extra weight of lint put into the bale. If gin saws are in good condition, of full diameter, and operated at 600 to 700 revolutions per minute, and if an effective doffing system is used, the seed can be well cleaned even with very loose seed rolls and smoothly ginned lint produced.
- (6) A classification or examination of the samples at regular intervals will reveal the quality of the ginning, and provide an indication of the underlying faults--whether they are with farm practices or ginning methods. Producers and ginners will find it profitable to take time to examine their samples, for much loss can be avoided by tracing gin damage to its source and making the corrections needed.
- (7) By proper harvesting and handling, the grower will preserve the full quality and value of the seed cotton that he produces. Proper conditioning, ginning, and packaging will preserve all the quality and value contained in the seed cotton that the grower delivers to the gin. Therefore, in the interest of the war effort and for the benefit of all those concerned, it is important--more so now than ever before--that farmers and ginners seek and get the best possible harvesting, handling, and ginning of their cottons.

If additional information or assistance is needed in connection with cotton ginning, get in touch with the State Gin Extension Specialist, or write to U. S. Cotton Ginning Laboratory, Stoneville, Miss.